

Cost Recovery Fees: A Proposal for Wilmington, North Carolina

Scott Shuford

The City of Wilmington, North Carolina is on the threshold of phenomenal growth. Recent initiatives to expand and improve transportation networks serving the city are expected to attract a surge of new industry to the area. City planning officials, in an attempt to ensure that adequate infrastructure is provided to accommodate new development, are examining the feasibility of an impact fee system. This article discusses the guidelines and methodologies that were used in designing the cost recovery system.

FOREWORD

The City of Wilmington has elected to follow the example of most other North Carolina cities which have enacted impact fees by attempting to obtain special enabling legislation to authorize fee collection. The City's first effort, in the Fall of 1986, was postponed by local legislators who felt they needed more information on what the City was proposing in order to introduce this legislation.

The City subsequently prepared the Cost Recovery Fee report, which provides the information the local legislative delegation was seeking. City voters, on March 31, 1987, also illustrated their commitment to funding needed transportation facilities by approving a \$20 million bond referendum primarily directed at thoroughfare improvements.

Despite this example of public concern regarding the City's transportation needs, and despite having received a report detailing the rationale and extent of the thoroughfare cost recovery fees, the local legislative delegation has exhibited some reluctance to introduce enabling legislation. Concern has been expressed that the fees are so high as to discourage new development.

The City staff is researching the financial effect that the fees may have on new development in order to provide a response to this concern. Given legislative scheduling, it appears that the earliest any enabling legislation can be introduced will be the latter part of 1987.

The City staff is also researching the possibility of using existing local authority, such as the subdivision process, for implementing the cost recovery fee system.

INTRODUCTION

The City of Wilmington, like many other communities across the country, is faced with an increasing gap between needed capital facility expenditures and the rev-

enues which support these facilities as state and federal grant opportunities are phased out and local revenue sources are maximized. Like many other communities, Wilmington is re-examining its development policies in light of these fiscal realities.

Because Wilmington is undergoing a period of relatively rapid growth, much of the need for new capital facilities is created by new development. Many capital facilities are affected by new development. These facilities include: drainage, water and sewer, and streets. It is only fair that new development should absorb its share of the cost of providing these new facilities, since it is this development which creates the need for these facilities.

The technique used by other communities in North Carolina and other states to insure that new development pays its portion of capital facility costs is the cost recovery fee system. Cost recovery fee systems are known by many other names; most commonly they are called "impact fees" or "development fees." Properly implemented, a cost recovery fee system collects a fee from a new development which accurately reflects the level of service that the new development requires from existing or needed capital facilities. This fee is then used to improve the capital facilities utilized by the new development.

Some communities have established cost recovery fee systems for one or two capital facilities affected by new development. Other communities have chosen to examine the entire range of capital facilities affected by new development and design a cost recovery fee system which reflects the total capital costs involved in serving this development. The City of Wilmington has elected to use the former approach, concentrating on drainage and thoroughfare improvements. These two capital facilities represent the most significant development-related capital costs Wilmington will face over the next ten to twenty years.

This report describes the cost recovery fee system proposed for Wilmington. It first establishes the rationale behind the system — why Wilmington needs a cost recovery fee system. Legal considerations involved in designing and implementing the system are explored in the next section. A substantial amount of research into other communities' fee systems has gone into designing Wilmington's proposed cost recovery fee system. The cost recovery fee system is then examined as it affects the City's capital facilities. It is in this section that the proposed fee levels are discussed.

RATIONALE

Cost recovery fee systems have evolved from the failure of other local government revenue sources to adequately provide capital facilities to serve new development during times of rapid growth. Property taxes, the major source of revenue for local governments in North Carolina, are designed to provide a stable, long-term revenue source for public facilities and services based on the demand created by properties within the local jurisdiction. Undeveloped land, quite naturally, pays relatively less property tax than developed land. When large quantities of undeveloped land are converted into developed uses, as is the case in rapidly-growing areas like Wilmington, the increased property tax revenues are usually insufficient to cover the large, short-term capital costs a local government incurs in serving the new development. Property tax rates often rise as a result, creating a situation in which all property owners in a community partially subsidize new development. Developers may also face construction moratoria when there are insufficient funds to provide capital facilities to serve new development.

Other potential revenue sources available to local governments suffer similar shortcomings. The general obligation bond provides short-term funds, but requires that all property owners help subsidize new development. Special assessments and special service or taxing districts serve to isolate the beneficiaries of particular services, but do not distinguish between uses which utilize existing capital facilities and those which necessitate facility expansion.

Cost recovery fee systems may eliminate two of the major problems associated with using local government revenues to fund capital facilities which serve new development. First, the revenues are obtained at or about the time the facilities will be called upon to serve the new development; this may eliminate the problem with obtaining enough front-end money to fund the facilities. Second, there is a clear connection between the monies received and the services rendered: those who benefit, pay. This resolves the equity question regarding existing residents partially subsidizing new development. Furthermore,

developers who contribute to the fee system are then correctly perceived to have a right to their share of the capital facilities which serve their projects.

The resolution of the equity question has an important benefit for developers. When they contribute to a cost recovery fee system, they find that many of the occasionally arbitrary and typically expensive "developer contributions" required by local governments to provide capital facilities to serve their projects will be eliminated. A single fee, which is also paid by each of their competitors, substitutes for many of the time-consuming negotiations and contracts which currently complicate the development process.

Cost recovery fee systems are therefore the most practical solution to shortfalls in revenues available to local governments for capital facility provision to new development during periods of rapid growth. Communities which have experienced rapid growth for an extended period have generally instituted cost recovery fee systems. Communities which are beginning to experience the effects of rapid growth are generally starting to consider cost recovery fee systems. Communities which are experiencing low rates of growth generally have not found the need for cost recovery fee systems.

The City of Wilmington is experiencing rapid growth. Disregarding recent large annexations, the City is expected to grow by more than ten percent between 1980 and 1990. Taking these annexations into account, the City's overall population growth between 1980 and 1990 could reach almost 30% (see Table 1). Given Wilmington's favorable climate, coastal location, strong economy and impending interstate highway link, this rapid growth can be expected to continue into the foreseeable future.

TABLE 1
CITY OF WILMINGTON
1980-1990 POPULATION PROJECTIONS

Year	"Old" City Population	City Population with Annexation Areas A&B
1980	44,000	—
1981	44,440	—
1982	44,884	—
1983	45,333	—
1984	45,786	—
1985	46,244	54,356
1986	46,706	54,900
1987	47,173	55,449
1988	47,645	56,003
1989	48,121	56,563
1990	48,602	57,129

Sources: City of Wilmington Planning & Development
Department
U.S. Bureau of the Census (1980 only)

The City is making extensive preparations to program and budget for this new growth. The 1986-91 Capital Improvement Program budget totals \$114,830,000 and consists of five categories of improvements:

Transportation Facility Improvements	\$15,550,000
Streets and Drainage	16,445,000
Public Facilities	6,550,000
Water and Sewer-Rehabilitation	2,710,000
Water and Sewer-New Facilities	73,575,000

Most of the funding for these improvements is expected to come from the issuance of bonds. A \$25,000,000 infrastructure bond referendum was passed by City residents in 1985. A \$16,200,000 transportation facilities referendum (Recently increased to \$20,000,000 by action of City Council; this brings the total 1986-91 CIP to \$119,280,000.) is scheduled for 1986-87, and an \$88,300,000 multi-issue referendum is anticipated for 1989-90.

The City Council has also recently adopted changes to its water and sewer policies which provide for new fees to be charged to new development. These fees are designed to reflect the costs incurred by the City in extending water and sewer lines, making capital facility improvements and absorbing new development into the City's water and wastewater treatment systems.

Unless similar fees to recover the other capital facility costs created by growth can be implemented, existing residents will be asked to foot most of the bill for these extensive improvements. While Wilmington has enjoyed considerable success in persuading its citizens to support much-needed capital facility improvements and expansions in the past, future reluctance on the part of the citizens to absorb new development's share of such projects may be encountered, and even expected.

Failure to receive citizen support for these bond referenda may result in Wilmington being unable to provide the capital facilities necessary to adequately serve new development. Given the large capital facility expenditures which are anticipated, it is therefore important for the City to institute a cost recovery fee system applicable to new development for financial, equitable and developmental reasons.

LEGAL CONSIDERATIONS

There are certain authorization and equity considerations which must be taken into account in designing a cost recovery fee system which can withstand legal challenge. The first of these considerations is whether the City has the authority to impose cost recovery fees. While numerous communities have simply instituted cost recovery fee systems under their police power authority (as a means of regulating the negative effects of new development),

most communities in North Carolina which have enacted these fees requested special enabling legislation from the state legislature in order to resolve all questions regarding local authority to impose these fees.

Wilmington's effort to receive such legislative authority for streets and drainage facilities during the 1986 "short session" was postponed. The local legislators felt they needed further information before acting upon special enabling legislation. It is partially in response to this request for more information that this report has been produced.

Given City Council support of both the concept and the design of the proposed cost recovery fee system, it can be expected that a new request for enabling legislation will be forwarded to the legislature for action during the 1987 "long session". This report will accompany that request as an informational device.

The second main issue which must be addressed in any legally-defensible cost recovery fee system involves equity considerations. If developers or homebuilders are asked to contribute fees to cover the capital costs of providing public services to their developments or homesites, it is only reasonable for them to expect that (1) the fees represent an accurate assessment of the actual costs incurred by the city in serving their project, and that (2) the services for which the fees are contributed are actually provided by the city within a reasonable period of time after the fees are collected.

This means, first, that an accurate assignment of fees must be designed into the cost recovery fee system by not only correctly estimating the actual capital costs involved in providing the service, but also by giving proper credit for other capital cost payments which can be actually determined or reasonably anticipated from the project in both the present or the near future. For example, the City of Wilmington has embarked on a major program of improvements to its capital facilities through the issuance of bonds. Therefore, reasonably anticipated bond payments for various capital facilities by developers or individual property-owners must be taken into account in determining the appropriate cost recovery fee for a particular project.

These equity considerations also mean that the City has an obligation to actually provide the capital facilities for which the fees are collected. While certain public services are generally provided at the time a particular project is developed, such as water and sewer service or police and fire protection, it may be quite some time before other services, such as parks or roads, are provided. It is important for all services for which cost recovery fees are collected to be provided within a reasonable period of time after fee collection.

What constitutes a "reasonable" period of time depends greatly on the type of service and whether or not the service has been programmed into the local government's budget process. Regarding the type of service, ten years may be regarded as a reasonable time period in which to provide a major thoroughfare but may not be regarded as a reasonable time period in which to provide a neighborhood park. As to programming the service, if there is a publicly-acknowledged commitment to providing the service at a particular point in the future, such commitment greatly determines the time period regarded as being "reasonable". Therefore, most cost recovery fee systems include a link between the fee collection process and the local government's Capital Improvement Program.

COST RECOVERY FEE SYSTEM

This section of the report describes the City of Wilmington Cost Recovery Fee System. This description includes the system's general design, the fee calculations for the capital services identified as being eligible for inclusion in the fee system, and the fee schedule which lists the applicable fees for each land use type.

General Fee System Design. The following discussion summarizes both the general design of the proposed City of Wilmington Cost Recovery Fee System and the process by which the system is used to calculate the fees for particular development projects.

Prior to final design of the fee system, certain general guidelines for the system's development were determined, based upon the research efforts described in the preceding section. These guidelines were used to produce the Wilmington system.

General Guidelines For Cost Recovery Fee System Development

1. The cost recovery fee system should concentrate on the more pressing city facility needs. All growth related capital costs for these needs should be included.
2. The cost recovery fee system should result in a fair and accurate accounting of costs, using current costs to estimate fees and excluding operating and maintenance costs and capital improvements not related to new development.
3. The cost recovery fee system should "credit" new development for: (a) Existing and reasonably-anticipated bond indebtedness relating to projects for which fees are paid (to avoid the issue of "double taxation"); and (b) Pre-existing deficiencies in and depreciation of city facilities which might be corrected with funds collected from cost recovery fees.
4. The cost recovery fee system should be designed by

professional staff who will be called upon to implement the system and whose operations will be affected by the system.

5. The cost recovery fee system should result in the long-term provision of services to the development(s) from which the fees are collected through separate service-specific capital improvement reserve funds linked to Wilmington's Capital Improvements Program.
6. The cost recovery fee system should be understandable, as well as inexpensive to apply.
7. The cost recovery fee system should be subject to periodic revision as conditions change (e.g., inflation).

THE OVERALL OBJECTIVE OF THE WILMINGTON COST RECOVERY FEE SYSTEM IS TO ACCURATELY IDENTIFY AND EFFECTIVELY RECOVER GROWTH-RELATED CAPITAL COSTS.

Once these guidelines were identified, each affected City Department was examined to identify capital facilities affected by new development. After considerable study, it was determined that the following major service categories contained identifiable growth-related capital facility costs: drainage, thoroughfares, and water and sewer services.

Among these identified services, growth-related cost recovery fees for water and sewer facilities have been calculated and addressed separately from this report. There are two primary reasons for separate consideration of water and sewer capital facilities. First, state statutory authority currently exists for Wilmington to initiate water and sewer capital facility cost recovery efforts. The second reason is that there are several short-term problems with the city's water and sewer facilities which demand expedient action.

Several other service categories have also been excluded from cost recovery consideration, but for different reasons than the water and sewer facilities. The Police Department anticipates no major capital expenditures for new buildings for the foreseeable future: expenses related to vehicle purchase, manpower, uniforms and equipment, etc. were generally regarded to be operating and maintenance costs, as opposed to capital costs. The Fire Department has made recent improvements which will provide adequate response time to all areas of the city for some time to come.

The city golf course operates in a self-supporting manner through user fees; although new development does place increased demands on the existing facilities, such demand is difficult to measure and there are no opportunities for expansion to accommodate this demand.

Improvements to parks and recreation facilities will be sought through different means. Other service categories which are primarily affected by new growth through increased demand for additional personnel were also excluded.

Once identification of the particular service categories to which the cost recovery fee system is to be applied was accomplished, attention was directed at measuring the growth-related costs which affect these service categories. Operating and maintenance costs and other capital facility improvement costs not related to growth were excluded. These costs are discussed in the following section.

It should be noted that the following discussion of drainage cost recovery fees is intended solely to serve as an example of how such fees are to be calculated and implemented. More data has to be obtained for each drainage basin and sub-basin prior to actual fee calculation and implementation. On the other hand, discussion of thoroughfare cost recovery fees presents a complete fee analysis and calculation, ready for implementation.

Drainage. The citizens of Wilmington voiced their support for a \$7.6 million bond referendum for drainage improvements in the Spring of 1986. Some of the money approved through this referendum will be used to install drainage facilities in the Burnt Mill Creek watershed to solve one of the City's most important drainage problems.

A portion of the Burnt Mill Creek watershed improvement project has been utilized to calculate the cost recovery fees associated with the City's drainage facility needs. This section of the watershed represents a fairly typical watershed within the City with regard to both existing and proposed drainage facilities. Considerable study of its drainage needs has been recently undertaken by the Planning staff. This has led to a thorough familiarity with the existing and required drainage facilities in this area.

This is the only area of Wilmington in which such an analysis has been performed. Consequently, the following fee calculation exercise is undertaken to serve as an example of how similar calculations can be performed for other areas of the city when thorough analyses of drainage needs are prepared. Until such analyses are prepared, no drainage cost recovery fees can be calculated or imposed.

The fee calculation process involved first determining the existing "regional" drainage facilities which have been installed in the past; these are facilities which were designed with more than site-specific drainage needs in mind. Once these facilities were identified, their current value was determined, based upon estimates of what it would cost to install these facilities today. Their total current value has been estimated at \$1,843,000.

The next step in calculating drainage cost recovery fees required determining the major improvements which are needed to bring the watershed area drainage system up to city standards (10 year, 24 hour storm event). These improvements, and their current value, are described below.



Calculating improvement costs.

Required Drainage Facilities for a Portion of The Burnt Mill Creek Watershed

<i>Required Facilities</i>	<i>Current Value</i>
Pipe	\$2,284,000
Manholes	179,000
Ditches (w/rip-rap)	581,000
Creek Bank Improvements	1,572,000
Pond Improvements	<u>1,648,000</u>
Total	\$6,264,000

Because fees paid by new development will be funding new drainage facilities, new development should not be liable for expenditures to correct the depreciation of the existing facilities. Any bond indebtedness incurred to provide facilities in the past, or that can be reasonably anticipated in the future, must also be credited to new development to avoid double taxation. Consequently, a "credit" must be given for both depreciation and bond indebtedness.

The methodology utilized in determining this credit was developed for the City of Raleigh by Drs. Michael A. Stegman and Thomas P. Snyder of the Department of City and Regional Planning at the University of North Carolina at Chapel Hill. (See source citation following Table 2.)

The depreciation portion of the credit is determined through the use of Table 2, a depreciation table which assumes a two percent real interest rate (that is, interest above the rate of inflation) for various replacement life cycles and growth rates.

TABLE 2
DEPRECIATION TABLE FOR A TWO PERCENT
REAL INTEREST RATE

replacement cycle or facility life (years)	growth rate (percent)					
	0.5	1.0	1.5	2.0	2.5	3.0
3	0.494	0.493	0.491	0.490	0.489	0.488
5	0.490	0.488	0.485	0.483	0.481	0.479
8	0.483	0.480	0.477	0.473	0.470	0.467
10	0.479	0.475	0.471	0.467	0.463	0.458
12	0.475	0.470	0.465	0.460	0.455	0.450
15	0.469	0.463	0.456	0.450	0.444	0.438
18	0.463	0.455	0.448	0.440	0.433	0.426
20	0.458	0.450	0.442	0.434	0.426	0.417
25	0.448	0.438	0.428	0.417	0.407	0.397
30	0.438	0.426	0.413	0.401	0.389	0.377
35	0.428	0.413	0.399	0.385	0.371	0.358
40	0.418	0.401	0.385	0.369	0.354	0.339
45	0.480	0.389	0.371	0.354	0.337	0.320
50	0.398	0.378	0.358	0.339	0.320	0.302
60	0.378	0.354	0.331	0.309	0.288	0.268
70	0.359	0.332	0.306	0.281	0.258	0.236
80	0.340	0.310	0.281	0.254	0.229	0.207
90	0.322	0.289	0.258	0.229	0.203	0.180
100	0.305	0.269	0.236	0.206	0.179	0.156

Source: "Establishing Facility Fees in Raleigh: Issues and Alternatives"; Michael A. Stegman and Thomas P. Snyder; Department of City and Regional Planning; University of North Carolina at Chapel Hill; July 1, 1986; p. 47.

Drainage facilities are assumed to have been provided at a rate similar to the City's growth over the life span of the facilities, which is estimated at fifty years. Over that period, the City's average annual growth rate has been 1.5%. Therefore, the appropriate depreciation factor is 0.358. This factor, when multiplied by the current value of the existing regional drainage facilities (from above), results in a facility depreciation estimate of approximately \$660,000 ($0.358 \times \$1,843,000$).

Total current bond indebtedness for the City with regard to drainage facilities is \$2.4 million. There is an additional approved bond debt of \$7.6 million which must also be included in credit calculation, bringing the total bond indebtedness to \$10 million. Adding the depreciation estimate to the \$10 million in bond indebtedness results in an overall credit estimate of \$10.66 million. This

credit estimate must then be apportioned among the various land use types according to their assessed value.

Note: It will be necessary to modify the bond credit calculated herein to reflect estimated fee collections which will be applied to reduce the overall bond debt. See the following section on thoroughfare cost recovery fees which shows how this modification is performed. Such modification cannot occur without performing careful growth projections for each drainage basin, work which has not yet been done.

Because drainage cost recovery fees will be assessed on an acreage basis, it is necessary to convert the credit to an acreage basis in order to simplify fee calculation. This was done by first determining the percent of total City assessed value for each land use type and the total number of acres of the City's land area which are devoted to each land use type. The assessed value data was generated from information received from the New Hanover County Tax Administrator's Office, while the acreage information was derived from a recent (October, 1985) land use survey by the Planning and Development Department staff.

Multiplying the total credit estimate of \$10.66 million by the percent of total City assessed value of each land use, and then dividing that figure by the total number of acres devoted to that land use, generates the appropriate credit per acre. This calculation process is shown below.

Residential:

$$\$10.66 \text{ million} \times 49.8\% \div 5,471 \text{ acres} = \$970/\text{acre}$$

Commercial/Office & Institutional:

$$\$10.66 \text{ million} \times 45.1\% \div 2,612 \text{ acres} = \$1,840/\text{acre}$$

Industrial:

$$\$10.66 \text{ million} \times 4.9\% \div 1,264 \text{ acres} = \$413/\text{acre}$$

The final step in determining the drainage facility cost recovery fee is to calculate the gross cost per acre for needed drainage facilities for each type of land use and to subtract the credit from that cost to produce the cost recovery fee per acre. This was done by determining the relative runoff rate for a number of land use types and prorating the total cost of all needed drainage facility improvements according to the relative impact of each land use type on the system. The basis for the relative differences between land use types are runoff coefficients (measures of the amount of runoff land uses produce—calculated by the City Engineering Department). The credit is then subtracted from that gross figure to generate the acreage fee. Table 3 provides this calculation.

Funds collected from drainage cost recovery fees will be placed into separate capital improvement reserve funds, segregated by drainage basins. Only funds collected from each drainage basin can be spent on drainage improvements for that basin.

TABLE 3
DRAINAGE COST RECOVERY FEES

Land Use Type	Runoff Coefficient	Gross Cost Per Acre	Credit Per Acre	Cost Recovery Fee Per Acre
Residential				
Low Density*	1.37	\$2,367	\$ 970	\$1,397
Medium Density**	1.88	3,262	970	2,292
High Density***	2.25	3,897	970	2,927
Commercial	3.19	5,528	1,840	3,688
Office & Institutional	2.25	3,897	1,840	2,057
Industrial				
Light Manufacturing	2.74	4,735	413	4,322
Heavy Manufacturing	3.00	5,188	413	4,775

*≤ 5 units/acre

**> 5 units/acre but ≤ 17.4 units/acre

***> 17.4 units/acre

Thoroughfares. As identified by residents and officials, the solution to Wilmington's transportation problems constitutes the highest capital improvement priority over the next few years. In order to provide the funds necessary to help solve these problems, the City staff has developed, and the City Council has approved, a transportation bond proposal which will be taken before residents for approval in the Spring of 1987. The entire bond package totals \$20 million. Of this amount, \$16,821,000 is slated for thoroughfare improvements. These thoroughfare improvements are described in Table 4 below. (Note that the costs for utilities have been deleted from the S. 17th Street Extension, University Parkway, 41st Street/ Holly Tree Road Extension and Independence Blvd. Extension projects to avoid double-counting those utility projects to be funded by water and sewer facility fees. Where utility relocation is an integral part of the proposed thoroughfare project, such as the Kerr Avenue widening project, the utility costs have been retained.)

Each of these thoroughfare improvements is a component of the Wilmington Urban Area Thoroughfare Plan (adopted 1986). While there are other thoroughfare improvement projects on the Thoroughfare Plan, the selected projects are those of highest priority within Wilmington. These six projects also constitute the probable upper limit of Wilmington's financial ability to address its thoroughfare improvement needs over the next ten years (the time

period in which these improvements are programmed to occur and for which this thoroughfare cost recovery fee system is designed).

These thoroughfare improvements, since they are based on a locally-adopted and state-approved Thoroughfare Plan, would eventually be constructed by the N.C. Department of Transportation based on the projects' priority ranking as compared with other local Thoroughfare Plan improvements across North Carolina. One option available to the City of Wilmington therefore is to patiently await state funding for these roadways.

Because the likelihood of such funding for most of these projects is virtually nonexistent over the short-term (0-10 years), Wilmington has opted to pursue local implementation of a portion of the Thoroughfare Plan by constructing five of the six Thoroughfare projects entirely with local funds and by purchasing portions of the right-of-way for Smith Creek Parkway to move that project into a higher priority ranking for eventual state construction. The reason for this local action can be traced to the rapid growth experienced by the Wilmington area since the early 1980's. When the City and New Hanover County updated the area's Coastal Area Management Act (CAMA) Land Use Plan in 1981, transportation was not regarded as a major issue; by the time of the 1986 update to the Land Use Plan, transportation was regarded as the primary local planning issue.

The Wilmington thoroughfare system is currently approaching its capacity to handle traffic in several city areas. However, if new development were to completely cease, Wilmington would be able to wait for state funding for its Thoroughfare Plan with minimal or negligible capacity problems. Therefore, the primary reason for the decision to pursue local funding of these thoroughfare improvement projects is to accommodate the impact of new development on the local thoroughfare system. It is therefore reasonable to expect this development to assume its fair share of the costs of providing these transportation facilities.

The proposed thoroughfare improvements are relatively evenly distributed across Wilmington. This distribution pattern, along with the generally similar cost estimates for each of the proposed improvements, results in the ability to consider the entire city as a single zone in the imposition of thoroughfare cost recovery fees. This contrasts with the drainage cost recovery fee system in which costs were expected to vary significantly for each drainage basin. The small size of Wilmington also supports this single zone concept. While several of the communities studied have used separate zones for thoroughfare fees, each zone typically exceeds the size of the City of Wilmington in area and population (the City of Raleigh, for instance, utilized three zones in its traffic development fee

TABLE 4
PROPOSED THOROUGHFARE IMPROVEMENTS

Project	Description of Project	From	To	Roadway Length (miles)	Current City Cost Estimate
Smith Creek Pkwy.	Right-of-way acquisition for future construction of 4 lane divided expressway	Eastwood Rd.	NE Cape Fear Bridge & N. Front St. (Dntn. Spur)	7.7	\$ 2,000,000
S. 17th St. Ext.	Design & R/W for 4 lane roadway, construct 2 lanes	800' S. of Shipyard Blvd	2500' W. of College Rd.	2.5	2,900,000
Kerr Ave.	Design & R/W (90'), & construct 5 lane roadway w/relocated and installed W & S utilities	Market St.	Wrightsville Ave.	2.0	4,253,000
University Pkwy.	Design & R/W for 4 lane roadway, construct 2 lanes	Wrightsville Ave. @ Mercer Ave.	College Rd.	1.6	1,800,000
41st St./Holly Tree Road	Design R/W (60' where practicable), and construct 3 lane (36') roadway	Oleander Dr.*	Pine Grove Dr.*	1.8	2,118,000
Independence Blvd.	Design & R/W (100') for 4 lane roadway, construct 2 lanes	Shipyard Blvd.	Carolina Beach Rd.	1.9 17.5	3,750,000 \$16,821,000

*A section of this corridor between 300' S. of Lake Ave. and Shipyard Blvd. will be constructed by a private developer and is not included in bond issue.

system; each zone was significantly larger than Wilmington in both population and land area.)

The City's thoroughfare improvements, which are projected to be partially financed with cost recovery fees, will be constructed with funds obtained from the issuance of bonds, as indicated previously. The cost recovery fees obtained in any given year will be applied to the bond payment(s) scheduled for that year, thus reducing the contribution to bond repayment made by general property tax revenue by the amount of the collected fees.

It will not be feasible to utilize thoroughfare cost recovery fees to cover the entire thoroughfare bond repayments for two reasons. First, the fee system is designed to initially recover costs associated with that new development which occurs over a ten year period. The proposed thoroughfares will be designed to provide traffic handling

capacity in excess of this ten year period. This excess capacity beyond the initial period will be paid for by cost recovery fees collected from the later development which consumes that capacity, not by development occurring at the present time. This means that although the cost recovery fee system is designed to recover the entire cost of the thoroughfare projects which are attributable to new development, the cost recovery process will occur over the entire effective life of the projects (i.e., until the Level-of-Service "D" capacity is reached), not just the initial ten year period.

Second, cost recovery fee generation is dependent upon the occurrence of new development. New development does not occur at a constant rate; therefore, the City is forced to reinforce its fee collections with the much more stable and predictable revenues derived from local property taxes.

With the exception of dividing the city into zones, the method used in calculating the thoroughfare cost recovery fees is similar to that utilized for the drainage cost recovery fees. First, the gross costs attributed to each type of land use are calculated based upon the proportional impact on the thoroughfares by each land use type. Second, the applicable credit for bonded indebtedness (both current and anticipated) and pre-existing thoroughfare capacity deficiencies is calculated. This credit is modified according to the anticipated contributions of the cost recovery fee system in retiring the bond debt. Third, the net cost for each type of land use in each zone is calculated by subtracting the gross cost figure from the applicable (modified) credit. Finally, the cost recovery fee is determined by multiplying the net cost by the relative distance of travel for each land use type. This process is described in greater detail below.

As indicated above, the first step in the thoroughfare cost recovery fee calculation process involves producing an accurate estimate of the thoroughfare costs which can be associated with various types of new development expected to occur over the next ten years. The NCDOT has prepared estimates of new vehicle trips which can be expected through the year 2005 for Wilmington. This estimate is performed as part of the state thoroughfare planning process, and provides an accurate estimate of the amount of impact new development will have on the local roadway network.

Because the NCDOT figures referred to in the paragraph above are based on the Wilmington urban area, an area somewhat larger than the Wilmington city limits, a correction factor must be introduced to adjust for the size difference between the state data base and the city limits. This factor has been determined based on the difference in total housing units between the Wilmington urban area and the Wilmington city limits for each of the three study periods (1982, 1990 and 2005). The adjustment factor has been computed as 0.57 for the period between 1982 and 1990 and as 0.54 for the period between 1990 and 2005. These factors are used in computing the 1987 and 1997 trips in the following paragraphs.

In order to calculate the total cost for thoroughfare improvements attributable to new development occurring over the next ten years, the following equation is utilized:

$$\frac{1997 \text{ traffic volume} - 1987 \text{ traffic volume}}{\text{Added capacity from proposed improvements}}$$

The above equation is from the previously-cited publication, *Paying for Growth: Using Development Fees to Finance Infrastructure* by Thomas P. Snyder and Michael A. Stegman of the Department of City and Regional Plan-

ning at the University of North Carolina at Chapel Hill (ULI; 1986; p. 115). It produces a measure of the proportion of the total costs of thoroughfare improvements which should be applied to new development occurring over the ten year period.

For the Wilmington cost recovery fee system, the equation is:

$$\frac{262,065 - 218,995}{113,300^*} = 0.38$$

*Note: See Table 5 for source of this figure.

This figure (0.38) is then multiplied by the total cost of the thoroughfare improvements, less any portion of the improvements designed to correct existing deficiencies (some \$790,000 of the Kerr Avenue project is used to correct existing capacity deficiencies) and to accommodate through traffic (estimated at 10% for the city area). This provides the total cost of the proposed thoroughfare improvements toward which cost recovery fees should be directed. The applicable cost for the City of Wilmington is therefore \$5.48 million ($0.38 \times \$16,038,000 \times .9$).

TABLE 5
PROPOSED IMPROVEMENTS AND
THEIR CAPACITIES

Proposed Improvement	ADT Capacity of Improvement*	No. of Peak Hour Trips**	City Cost of Improvement
Smith Creek Parkway	44,000	4,400	\$2,000,000
S. 17th St. Extension	13,800	1,380	2,900,000
Kerr Ave.***	14,100(net)	1,410(net)	3,470,000
University Parkway	13,800	1,380	1,800,000
41st St./Holly Tree Rd.	13,800	1,380	2,118,000
Independence Blvd.	13,800	1,380	3,750,000
	113,300	11,330	\$16,038,000

*Average Daily Traffic (ADT) capacity based on proposed number of lanes, Level of Service "D".

**Peak hour trips estimated at 10% of ADT capacity (from *Wilmington Transportation Study: Technical Report 2*; NCDOT; p. 16). Figure shown is total peak hour capacity, not 10 year peak hour estimates.

***Kerr Avenue is currently a two lane facility serving approximately 17,000 vehicles per day; proposed improvements will increase capacity to 31,100 vehicles per day; improvement costs reflect deletion of costs needed to improve existing ADT capacity to Level of Service "D".

This \$5.48 million figure must then be allocated to the development anticipated to occur over the next 10 years according to that development's relative impact on the

thoroughfare system. The unit of measure selected for determining this relative impact is the peak hour trip. The peak hour trip is a measure of the amount of traffic generated by various land uses at the highest (or peak) hour of traffic generation. The Institute of Traffic Engineers provides standard estimates for peak hour trip generation for a wide variety of land uses.

For Wilmington, peak hour traffic is estimated to be 10% of average daily traffic (*Wilmington Transportation Study: Technical Report 2*; NC DOT; 1986; p. 16). The local gross cost per peak hour trip is therefore determined by multiplying the average daily traffic generated by new development (previously estimated as 43,070 trips) by 10%, and then dividing the total thoroughfare cost applicable to new development (\$5.48 million) by the estimated number of peak hour trips (4,307). This provides a gross cost per peak hour trip of \$1,270.

The gross cost must be further modified to reflect average median trip lengths anticipated for different land uses. This provides a further refinement of the relative impact created (and relative benefit received) by different land uses. Locally-derived average trip lengths were used to provide this modification (*Wilmington Transportation Study: Technical Report 1*; NCDOT; 1985; p. 17). These average figures were translated into relative terms by dividing the trip lengths for all nonresidential uses by the residential trip length. This provides a relative comparison which is shown in Table 6.

TABLE 6
AVERAGE TRIP LENGTHS AND RELATIVE
COMPARISON TO RESIDENTIAL USE

Land use	Average Length (Minutes)	Relative Comparison
Residential	6.66	1.00
Commercial		
Retail	6.54	0.98
Other	6.54	0.98
Office & Institutional	6.84	1.03
Industrial	6.84	1.03

The relative comparison factor is then utilized in calculating the thoroughfare cost recovery fees.

The next step in the fee calculation process is to determine the credit which should be applied to the gross thoroughfare fee calculated above. This credit is a measure of three things: (a) The pre-existing capacity problems on the city's thoroughfares; (b) depreciated city-maintained thoroughfares; and (c) the city's bonded indebtedness (existing and reasonably anticipated) relating to thoroughfare improvements. Use of the credit is needed to avoid: (a) new development paying fees to correct existing defi-

ciencies (both roadway capacity deficiencies and depreciated); and (b) new development paying more than its fair share by having to pay for both the cost recovery fee and a portion of the debt repayment coming from property taxes (thus creating a situation of "double taxation").

The credit must be modified to include the anticipated contributions of new development in the form of collected cost recovery fees, since these contributions will be applied to retiring the thoroughfare bond debt. Since new development is expected to generate approximately \$5.48 million in thoroughfare costs over the next 10 years, and since the cost recovery fee system is intended to collect 100% of these costs, the credit must be adjusted downward by the amount of \$5.48 million. Similarly, fee collections estimated for the remaining 10 years (\$4.3 million) must also be subtracted from the credit. The total credit adjustment is \$9.78 million, which represents the estimated fee collections over the life of the thoroughfare bond.

Pre-existing capacity deficiencies, not otherwise accounted for (i.e., Kerr Avenue), exist at only one location, the intersection of S. College Road and Oleander Drive. Intersection improvements at this location are estimated to cost \$2 million, with the City's share of this State construction project being 30%, or \$600,000.

The city-maintained thoroughfare depreciation is estimated using the depreciation table referred to in the drainage fee section (see Table 2). The city Engineering Department has estimated the cost of resurfacing all city-maintained thoroughfares at approximately \$730,000. Utilizing a depreciation factor of 0.463 (from Table 2), the applicable depreciation credit is \$340,000 ($\$730,000 \times 0.463$).

The thoroughfare bond is \$16.82 million, from which \$9.78 million must be subtracted to account for that portion of the bond retirement to be paid for by cost recovery fees. This provides the bond portion of the credit, which amounts to \$7.04 million.

The total credit is therefore \$7.98 million ($\$600,000 + \$340,000 + \7.04 million), which is divided by the current tax base (\$1,612 million) to produce the tax rate necessary to retire a debt of this amount. This rate (0.0050) is utilized to determine an average credit used to modify the gross fee calculated above. The average credit is estimated at \$350, representing an assessed valuation for residential uses of approximately \$70,000 per unit and for nonresidential uses of approximately \$70 per square foot.

Table 7 brings together the different factors discussed in the above paragraphs. Peak hour trips are shown for different land uses in this table. Also shown are net cost estimates for different land uses based upon the following factors: (a) peak hour trip estimates for each land

TABLE 7
PEAK HOUR TRIP GENERATION AND COST RECOVERY FEE CALCULATION

Land Use	Ph Trips*	Net Cost**	Trip Length Factor	CR Fee
Residential	(All figures per residential unit)			
Single Family	0.5	\$460	1.00	\$ 460
Multifamily	0.3	275	1.00	275
Mobile Homes	0.3	275	1.00	275
Commercial	(All figures per 1,000 gross square feet)			
Auto Dealership	2.3	\$ 1,058	0.98	\$ 1,035
Bank	8.4	3,864	0.98	3,785
Convenience Store	23.4	10,764	0.98	10,550
Fast Food				
Restaurant	15.8	7,268	0.98	7,125
Grocery Store	4.4	2,024	0.98	1,985
Restaurant	5.2	2,392	0.98	2,345
Shopping Center/ Retail (Small)***	3.0	1,380	0.98	1,350
Shopping Center/ Retail (Large)***	1.6	736	0.98	720
Office & Institutional	(All figures per 1,000 gross square feet)			
Government Bldg.	3.0/1000 GSF	\$ 2,760	1.03	\$ 2,845
Office	1.0/1000 GSF	920	1.03	950
Industrial	(All figures per 1,000 gross square feet)			
Industrial Park	0.5	\$ 460	1.03	\$ 475
Manufacturing	0.4	368	1.03	380
Mini-warehouse	0.1	92	1.03	95
Truck Terminal	0.4	368	1.03	380
Warehouse	0.8	736	1.03	760

*P.M. Peak Traffic/ITE estimate

**Includes average credit. Note: For commercial uses, a diversion factor of 0.5 is applied in calculating the net cost in order to adjust for the traffic already on the roadways which frequents commercial establishments. This factor approximates the diversion factor utilized by the City of Raleigh (0.49). (See *Paying for Growth: Using Development Fees to Finance Infrastructure*; Thomas P. Snyder and Michael A. Stegman; Urban Land Institute; p. 116.)

***Shopping Center/Retail (Small) refers to establishments under 500,000 square feet in size; Shopping Center/Retail (Large) refers to establishments of 500,000 square feet or larger in size.

use(Px); (b) gross cost per peak hour trip (\$1,270); and (c) average credit (\$350). The formula used to calculate the net cost is shown below.

$$\text{Net Cost} = (\text{Px}) \times (\text{Gross Cost} - \text{Average Credit})$$

or

$$\text{Net Cost} = (\text{Px}) \times (\$1,270 - \$350)$$

or

$$\text{Net Cost} = (\text{Px}) \times \$920$$

The net cost is then multiplied by the trip length factor to determine the applicable cost recovery fee for each land use shown. Peak hour trip generation rates for several other land uses are shown in Table 8.

Funds collected from thoroughfare cost recovery fees will be placed in a capital improvement reserve fund, separate from other cost recovery fee funds or capital improvement funds. The collected funds will be utilized to retire the thoroughfare bond debt.

TABLE 8
PEAK HOUR TRIPS FOR OTHER
SELECTED LAND USES

Land Use	Peak Hour Trips	Trip Length Factor
Commercial*		
Car Wash	55/site	0.98
Golf Course	0.2/parking space	0.98
Hotel/Motel	0.4/room	0.98
Marina	0.1/berth	0.98
Movie Theater	0.1/seat	0.98
Service Station	12.5/site	0.98
Office & Institutional		
Day School	0.1/pupil	1.03
Elementary School	0.1/pupil	1.03
High School	0.2/pupil	1.03
College	0.1/pupil	1.03
Nursing Home	0.1/bed	1.03

*Diversion factor of 0.5 to be applied to all commercial uses.

Coastal area near Wilmington.



Thoroughfare recovery fees.

Examples of Applying Thoroughfare Cost Recovery Fees

Example 1. What will be the thoroughfare cost recovery fee for a single family house? Table 7 indicates that the per unit cost recovery fee for a single family residential use is \$460; the fee is therefore \$460.

Example 2. What will be the thoroughfare cost recovery fee for a 100 unit garden apartment project? From Table 7, the per unit cost recovery fee for multi-family uses is \$275. The total fee is therefore \$27,500 (100 units \times \$275 per unit).

Example 3. What will be the thoroughfare cost recovery fee for a 20,000 square foot shopping center? Table 7 shows that the cost recovery fee for small-sized shopping centers (under 500,000 square feet) is \$1,350 per each 1,000 gross square feet. The total fee for this use is \$27,000 ($\$1,350 \times 20$).

Example 4. What will be the thoroughfare cost recovery fee for an office building containing 35,000 square feet? From Table 7, the cost recovery fee for each 1,000 gross square feet of office use is \$950; this means that the thoroughfare cost recovery fee for a 35,000 square foot office building is \$33,250 ($\950×35).

Example 5. What will be the thoroughfare cost recovery fee for 75,000 square foot industrial park use? As Table 7 indicates, the cost recovery fee for each 1,000 gross square feet is \$475. The fee for this use is \$35,625 ($\475×75).

Scott Shuford, the principal author of this article, is a Senior Planner for the City of Wilmington. He is a 1981 graduate of the Department of City and Regional Planning of UNC-Chapel Hill.